GARDEN AND FOREST.

PUBLISHED WEEKLY BY

THE GARDEN AND FOREST PUBLISHING CO.

OFFICE: TRIBUNE BUILDING, NEW YORK.

Conducted by . . . . . Professor C. S. SARGENT.

ENTERED AS SECOND-CLASS MATTER AT THE POST OFFICE AT NEW YORK, N. Y.

NEW YORK, WEDNESDAY, FEBRUARY 14, 1894.

TABLE OF CONTENTS.

PAGE.

EDITORIAL ARTICLE:—Horticultural Novelties 61
Where the Work of the Landscape-gardener should begin. *H. A. Caparn.* 62
Exotic Trees and Shrubs for Florida Gardens.—II. . . . . *H. Nehrling.* 62
Notes for Mushroom-eaters.—IV. (With figures.) . . *Professor W. G. Farlow.* 63
NEW OR LITTLE-KNOWN PLANTS:—A Fastigiate Sugar-maple. (With figure.) 65
New Orchids . . . . . *William Robinson.* 65
CULTURAL DEPARTMENT:—The Conservation of Water for Orchards. . *I. P. Roberts.* 66
Grapes in January. . . . . *E. P. Powell.* 66
Annual Flowers from Seed.—I. . . . . *J. N. Gerard.* 67
Single White Pæonies . . . . . *S.* 68
Hardy Carnations . . . . . *R. A.* 68
CORRESPONDENCE:—Mandarin and Tangarine Oranges . . . . . *S.* 68
Forestry and the State . . . . . *M. L. D.* 69
RECENT PUBLICATIONS 69
NOTES 70
ILLUSTRATIONS:—Coprinus comatus (Horsetail Mushroom). Small specimen—edible, Fig. 10 64
Cantharellus cibarius, Chanterelle (two-thirds natural size)—edible, Fig. 11. 64
A Fastigiate Sugar-maple, at Flushing, New York, Fig. 12 65

Horticultural Novelties.

EVERY year, as the seed and plant catalogues come with their glowing descriptions of new garden-plants, the buyer is confronted with the problem whether he shall test some of the more promising ones or wait until the experience of others has demonstrated their actual value. New flowers, new ornamental plants, new fruits and new vegetables in great numbers are sent out every year, and the man who has them for sale rarely troubles himself to explain their faults or weaknesses, even if he knows them, but he naturally takes good care to paint their real or fancied merits in the brightest colors at his command. Of course, those who put utter confidence in these one-sided descriptions are often disappointed, until at last they distrust every statement and assume a hostile attitude toward every new introduction. It is plain, however, that if we reject everything because it is novel, we set ourselves against all improvement, and, in fact, we deny the possibility of any improvements. This is clearly unsound, for, in the first place, there is always the possibility that new species may be discovered or that plants hitherto unknown to cultivation may be introduced, and when such introductions have the endorsement of some well-known collector, it is not difficult for those who are familiar with plants which are closely related to the new ones, to decide whether it is worth while to give hospitable welcome to the new-comers. Again, plants always have a tendency to vary, and, by sporting or intercrossing, new varieties of old plants are constantly appearing. It by no means follows that a new variety is superior to the old in any respect, and it is highly improbable that it surpasses known forms in every respect, and yet, so long as we believe that the limit of improvement in the evolution of any plant has not yet been reached, we cannot afford to neglect all new forms. Cosmos hybridus has not been planted to any considerable extent until within a few years, and yet we see in several seed-lists the advertisement of new strains which are to give more and larger flowers, and flowers of purer color than the ordinary type. Last autumn we inspected some of these flowers, which showed a manifest advance over any we had before seen, though whether these improved characters will persist and be reproduced from seed, we have no means yet of knowing. In such cases as this we have no guide but the trustworthiness of the dealer, and yet there is little doubt that the man who tests many novelties, and finds himself often deceived, will have more pleasure out of his horticultural experiments than he who assumes the attitude of repugnance against everything that is new.

It would be of considerable advantage if we could formulate out of the teachings of reason and experience some definite code of rules to guide us in determining what novelties we should consider the most hopeful, and which ones we should distrust; but this seems impracticable with our present knowledge. We know something of a plant when we know its pedigree; we know something of a hybrid or cross-bred plant when we have some knowledge of its parents, and the time may come when we may know a good deal more with such data at command. Still there are some general principles which it is worth while to consider, and this is especially true in the case of new fruits. Certain phases of this question were discussed at the recent meeting at Rochester, and Professor Bailey laid down some propositions which it is worth while to consider. We may premise that short-lived plants change most rapidly—that is, in a given number of years a plant with the greatest number of generations shows the greatest variation. For example, there is as great a difference between the Strawberries of to-day and the Strawberries of ten years ago as there is between our present varieties of Apples and those of a hundred years ago. Again, plants which are propagated by seed constantly tend to differ from their parents, and finally diverge so widely as to need new names. Plants which are propagated from abnormally developed parts, like the Potato, constantly tend to deteriorate unless they are selected and grown under the very best conditions. Plants propagated from normal or invariable parts by cuttings or grafts remain substantially the same for long periods of time. It should also be remembered that an improvement in the type must come from the origination of new forms, and a new form may have merit, even if it does not surpass old ones in most qualities, for it may have some attribute which fits it for a new use, for supplying an unfilled gap, for new regions or soils or tastes.

If, then, we assume that the evolution of cultivated plants follows to some extent the laws of evolution of new types in nature, we may constantly hope for improvement so long as there is change in the physical features of the globe brought about by human habitation, for new plants are always found to adapt themselves to these new conditions. These changes of environment have been very rapid in our own country and they are still going on, and until these physical conditions are more firmly established we may hope for new fruits to meet our new wants. As our vast territory has been brought under cultivation, all plants, and especially those grown for fruit, have responded with wonderful facility to the demands which new climates and new human wants have placed upon them. It is worth noting, that this adaptability has been most marked in fruits which were near to the wild type, and which find themselves, therefore, under quite new conditions in cultivation. Our native Plums have given us, within forty years, two hundred varieties, adapted to a remarkable range of habit and use, while our Blackberries and Raspberries, within a generation, have almost equaled the advance which our native Grapes have made in a century. We cannot hope for such rapid improvement in the future, because the more good varieties of any plant which are produced, the more strenuous will be the rivalry between them. But because new varieties will be more rare among the old and standard fruits, it does not follow that they will not be produced at all. On the contrary, we may expect that desirable novelties will be developed as long as horticulture needs them.

The sum of the matter, to paraphrase Professor Bailey's conclusion, is (1) that the older and more improved the type

the more slender are the chances of securing worthy novelties; (2) that there is the most use for novelties among plants which are propagated by seeds, or by normally developed parts, because these plants quickly run out by variation; (3) that valuable novelties appear less frequently in old regions than in new, because of the greater competition of established varieties there; and (4) that the merit of a novelty lies in its adaptability to some particular use or demand. A good novelty need not surpass all old varieties in any particular, or any old variety in all particulars. What it does need is to be fit for some entirely new condition or use, as, for example, a currant or gooseberry, which would be sweet and tender enough for dessert fruit, might be a useful novelty even if, in other respects, it were inferior to all existing varieties. It is prudent, therefore, to be cautious about adopting novelties among the old standard fruits in old horticultural regions, and to be suspicious of all those which are recommended indiscriminately as having every good quality, or for all regions.

Where the Work of the Landscape-gardener should begin.

THE great majority of cases in which the invention of the landscape-architect is called upon are those where the land about a dwelling-house is to be adorned with regard to convenience and economy of space. The scheme must not only be a thing of beauty in itself, but must be devised to set off the appearance of the building from without and to display its own best effects from within the walls. The character of the arrangement changes with its distance from the house, the central object on whose position depend all lines of road and walk, all forms of plantation and lines of vista, both in length and direction. Yet there are few instances where the idea is broached of consulting the artist, who is responsible for the regulation of all this, as to the position of the central object, which must of necessity control the whole design. Both owner and architect are usually ignorant of, or indifferent to, its importance, and consult convenience or prospect (sometimes), or often, probably in the absence of definite reasons, are guided by caprice merely. To the architect especially this question of location is of extreme importance, as his work requires the accessories of site and surroundings for its perfect expression. It is no discredit to him that he is usually unable to decide this important matter, depending as it does on many considerations entirely apart from his ordinary lines of study. But it seems unaccountable, that being able to point to many buildings whose impressiveness is vastly enhanced by their situation, he should so seldom think of calling on the help of his fellow-artist of the landscape to show him where his work may receive its due advantage from its surroundings.

Still more rarely is the foresight of the landscape-artist allowed to have any influence on the placing of the rooms, that part of their attractiveness which depends on pictures seen from the windows, when not left to chance, being provided for by those who, whatever may be their appreciation of existing beauties, are quite unable to foresee possible ones. Yet every dwelling owes much of its charm to what is seen from within.

A primary factor in the placing of a country house is prospect, or the scenes within and without the grounds that are visible from the windows. A building set with due attention hereto will almost inevitably stand high, thus ensuring good drainage and fresh air. Aspect, though very important, depends in great measure on arrangement of the rooms. Points of vantage for the house are few on most grounds, while facility of access to it can generally be contrived in many ways; drives can have their length concealed, or even made a source of interest, by their courses and their relation to the planting.

Where the surface is not very uneven, the combined inexperience of owner and architect commonly results in setting the house in the middle of the grounds. This position is, as a rule, the most disadvantageous that could be selected for extent and variety of lawn-surface and propriety of lines of approach; all vistas of importance within the boundary are obstructed, and the building itself becomes always too obtrusive an object, out of whose presence it is difficult to get. All these causes unite to detract from the apparent extent of the place. Such impediments to unity of design decrease inversely with the size of the place, but, though most apparent on a small one, are never inconsiderable, as the character of the work and the effects produced will vary with the number of acres. But considerations like these seldom affect the decision of the architect or his employer. The former ignores his best ally, who, when choice of a suitable spot is difficult, can supply definite reasons for his conclusions. If his advice were sought in time, his task would often be easier and the satisfaction of the owner greater; but it generally happens that when the structure is built and immovable, the architect of the landscape is called in to adjust his ideas to the mistakes of his predecessors, and to stake his own reputation and that of his art on a composition whose salient features have been already ordered by people indifferent to or unconscious of their significance.

Pittsburgh, Pa. *H. A. Caparn.*

Exotic Trees and Shrubs for Florida Gardens.—II.

CLETHRA ARBOREA, an exquisite Ericaceous plant, grows well on high Pine-land, but, unfortunately, it is frequently cut back by severe frosts. In a half-shady, sheltered spot, however, it is perfectly hardy. The leaves are shining green, and the fragrant white flowers appear in racemes at the top of the branches. It attains a height of ten to fifteen feet, is of straggling growth, and has the appearance of a small tree. C. quadrangulata, raised from seed, grows also well in the sandy soil, but is still more tender than the preceding.

Daphne Indica, a native of China, is one of the most beautiful of shrubs, highly prized as a greenhouse-plant in northern countries. In Florida it is easily grown if planted in a shady spot. In the autumn of 1889 I sent down a small plant, which was planted out under the shelter of a shed which is open on all sides, and over which dense masses of Passiflora cœrulea clamber. The soil is the common white sand and a little muck. Although the plant was rarely fertilized and watered, it is now about four feet high and blooms profusely in winter. Sessile clusters of white or rosy white and fragrant flowers appear on the ends of the branches and last for a considerable time. D. Cneorum, which was planted out in a like position, was an entire failure.

Duranta Plumieri, a native of the West Indies and South America, grows vigorously in almost all parts of Florida, being generally known by the name of Golden Dewdrop. The pretty blue flowers, which appear in great abundance in slender racemes toward the end of the branches, are followed by clusters of golden berries, hanging in graceful profusion six months of the year. The evergreen leaves are oblong-lanceolate, and the branches are spinose. The compact growth, evergreen foliage, pretty blue flowers and golden berries combine to make this Duranta a very fine ornamental shrub. It grows in the poorest soil; and, having escaped from the gardens, is now found wild in some parts of Florida.

Escallonia rubra and E. floribunda made a feeble growth in the first year, and died in the second, while E. macrantha grows well under a shed. I feel quite certain that most Escallonias will grow well in Florida if planted in rich soil and in a half-shady position. Most species are growing wild in Chili in rather dry situations.

Euphorbia pulcherrima, generally known as the Poinsettia, is a notable feature in all the gardens of the Gulf region. My plants grow to a height of eight to ten feet, but are cut down by several degrees of frost almost every year, and sprout from the roots in spring. In November they begin to bloom. The bright vermilion bracts of the

Poinsettia are well known as holiday ornaments of northern greenhouses, and here in the open air their blazing color can be seen from a great distance. In spring the plants must be cut back severely in order to induce them to branch out more freely. A plant eight or ten feet high, with twelve to fifteen or more flower-heads, is a magnificent sight. The Fire-bush, as it is called in Florida, is perfectly at home in the sandy soil.

Franciscea (Brunfelsia) calycina, a native of Brazil, is an exquisite shrub with large lanceolate light green leaves and large trusses of purple flowers, which appear in succession throughout the spring, summer and fall months. F. eximia, F. Lindeniana, F. confertiflora, F. hydrangeæformis, F. latifolia and F. uniflora are all broad-leaved evergreen shrubs with blue flowers. A number of these were sent to Florida in the fall of 1885 and planted out in a small clearing near Lake Audubon, but they did not get the necessary care, and all were lost. F. uniflora has been grown with great success in Mr. E. H. Hart's garden. It was planted in a half-shady position, where it is perfectly at home. Mr. Reasoner grows another species from the West Indies, F. Americana, whose fragrant flowers are yellow when opening, but finally become white.

Gardenia florida and its varieties, natives of China, but known under the rather inappropriate name of Cape Jasmines all over the south, thrive admirably in Florida, and make a beautiful display, especially when in full flower. Specimens ten to twelve feet high, and as much in diameter, are often seen on old places. The evergreen, shining leaves, the pure white double flowers exhaling a delicious fragrance, the dense growth and the ease with which the plants are grown into fine specimens, place them in the front rank of ornamental shrubs. The stunted yellow-leaved specimens which we sometimes see in south Florida only prove the carelessness of their owners. A little fertilizer and a heavy mulching will make fine specimens.

Grevillea robusta, Silk-tree, or Silk Oak, an Australian tree of great beauty, grows as well as Magnolias do on the dry sandy soil. The large fern-like leaves are covered with a silky down. Trees in Orlando, planted six years ago, are now twenty to twenty-five feet high and show a dense crown of branches and leaves. The flowers appear in panicled racemes and are of a beautiful orange color. The variety Pyramidalis has a broad dense spreading crown and is far superior to the type as a shade-tree. Grevillea Hilli, of which I have a number of young plants, is said to be very beautiful.

Embothrium coccineum, of Chili, also a member of the order Proteaceæ, is an exceedingly beautiful broad-leaved evergreen tree, bearing exquisite red flowers in great abundance. It grows well in the gardens of the Riviera, and even in Ireland, and ought to be tried extensively in Florida.

Hibiscus rosa-sinensis, Chinese Hibiscus, is one of the best of flowering shrubs, being equally effective as a single specimen and in groups. Its habit is always good, its branches being dense and its leaves of a rich glossy green. The many garden-varieties are all desirable. All are easily grown on high poor Pine-land, and with a little care and fertilizer three-year-old plants attain a height of ten to twelve feet. The single-flowering varieties are stronger growers than the double ones, but the latter are more profuse bloomers. Being tropical plants they luxuriate in the full rays of the sun. A group, consisting of about a dozen forms, is a picture which makes a lasting impression. If massed together, so that the ground is shaded, they do not need so much water as single specimens. The ground around them should always be heavily mulched. In groups the single varieties must find a place in the centre or in the background, as they are of the most vigorous habit and are certain to overtower the double kinds. The garden varieties are too numerous to name, but they range through many colors, and it is not difficult to make a good selection.

Hibiscus mutabilis, Cotton Rose, or Confederate Rose, is a small tree of rather open habit. I first noticed it in the gardens of New Orleans, and later at Mobile, Pensacola and Jacksonville. It is a fine plant when in bloom, bearing at the same time white and red flowers, and thus presenting a very striking appearance. The showy double flowers are white in the morning, changing to pink at noon, and to deep red at night. As the flowers last almost to the middle of the next day, the contrast of the white and red blossoms is very impressive. This plant is also known as the Mexican Rose; it is, however, a native of China and India, and thrives well on high Pine-land, but grows to perfection in rich hummock soil.

Hibiscus Syriacus, Althea, Rose of Sharon, in many varieties, grows well in Florida. Though I do not grow this shrub myself, I have seen several fine specimens near Gotha.

Hydrangea hortensis, the Hortensia of China, is growing luxuriantly under the protection of a shed, near Viburnum-tinus, Daphne Indica and Myrtus communis. It flowers profusely in winter, commencing late in October or early in November. I planted out the common rose-colored variety, but in Florida the flowers have assumed a deep indigo-blue. If well fertilized, mulched and shaded, this fine old plant thrives in all parts of Florida. H. Otaksa, H. Thomas Hogg and H. stellata grow equally well under the same treatment.

Milwaukee, Wis. *H. Nehrling.*

Notes for Mushroom-eaters.—IV.

GILL-BEARING FUNGI—CONTINUED.

AMONG our most easily recognized forms is the Parasol-fungus (Fig. 5, p. 44), Agaricus procerus, which is edible, and not easily mistaken for poisonous forms. It has white gills and spores, but no volva, and the ring is not fixed, but may be moved up and down. The stipe is very long, hollow and rather slender, and the pileus is closely covered with scales free at the outer edge, and when expanded is not flat at the centre, but raised in a blunt projection. The color varies from nearly pure white to more frequently a pale brown, and the fungus often attains a considerable size, so that it can be seen from a distance as it stands up in the grass. The substance is tougher than that of the species previously mentioned, and it remains for some time without decaying. The only species closely related botanically to the Parasol-fungus which we can stop to consider is Ag. naucinus, which is found only in the autumn, when it is not uncommon on lawns. The fungus-gatherer is often puzzled by this species, which, on the one hand, resembles the true mushroom, and, on the other, resembles some of the poisonous white-spored species. From the latter it can at once be distinguished by the absence of all trace of a volva. From the former it is distinguished by its white, not purple, spores, and by its gills, which remain white until quite old, when they turn very slightly pink.

After the true Mushroom, our commonest and best species, considered by some even better than the mushroom, is the Horsetail mushroom (Fig. 10), which abounds in fields and by road-sides in the autumn, and is sold to some extent in the Boston market, but, as far as we know, not elsewhere in this country, under the name of English mushroom. The Horsetail mushroom springs up in groups, often of considerable numbers, and the pileus, instead of opening, remains like a closed umbrella until it begins to decay. The pileus is oval in shape and densely covered with shaggy scales of a white color. The stipe is hollow and the small ring is quite loose. The gills are at first white, and then pinkish until decay begins, when the whole fungus quickly changes to a black fluid mass. The spores are black. We have two very common forms closely related to the Horsetail, which grow in dense clusters near the base of stumps and trees, but in neither form are there the shaggy scales or the ring. Furthermore, mistakes here are not dangerous, for the two species are not poisonous, and one is certainly edible, but not very agreeable, at least to the writer.

Every one has noticed the very pretty fungi with smooth bright red pilei which spring up in large quantities in and near woods and groves during the summer. They belong to the genus Russula, which has white spores, and is dis-

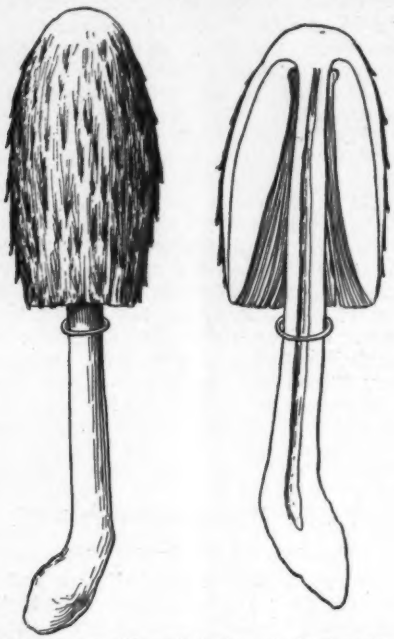

Fig. 10.—Coprinus comatus (Horsetail Mushroom). Small specimen—edible.

tinguished from the species of the genus Agaricus, described above, by the fact that the pileus is quite thin and the gills are arranged very regularly like the spokes of a wheel—that is, there are few or no short gills inserted between the long gills. The gills are usually pure white, but may be cream or buff color. Several of our common species of Russula have a very acrid, peppery taste, and are poisonous, although it is claimed that the acridity and poisonous property may be removed by cooking. However that may be, the good and bad species of Russula are distinguished from one another with great difficulty, and unless one is an expert he had better abstain from using any of the Russula species. As they are mostly small and have but little substance, they are, on this account, of comparatively little value at best.

In none of the species we have as yet mentioned is there to be seen any milk-like fluid which oozes out in drops when the fungus is broken or wounded. The genus Lactarius, however, contains a good many striking species which are characterized by an exudation of a more or less milky fluid, which is usually white or yellowish, and to the taste may be very peppery, like that of the Russulæ, or mild and pleasant. Fortunately, the best of our Lactarii, L. deliciosus, is easily recognized by the fact that it is practically the only one of our fungi which when broken or cut gives out a copious deep yellow-red milk, which slowly becomes greenish in drying. It is often very common in evergreen woods near our mountainous regions, but is hardly found in lower districts. It is of a clear yellow-red color throughout, with a concave, somewhat mucilaginous, pileus and hollow stipe. It can hardly be mistaken for any other species when in good condition, although, as it becomes old and dry, when it is not very good eating, it resembles another species which is, however, not poisonous. In this connection we should mention another species, Lactarius Indigo, one of the wonders of our fungus flora, which is of a beautiful blue color and gives out an abundant indigo-blue juice. We do not know whether this species is edible or not, but its repulsive taste does not tempt one to experiment with it. To sum up, the beginner should avoid all fungi which give out a milky juice unless the juice is red. The acrid species should not be used at all, and, even when the milk is not acrid, experiments should not be made without caution.

We can only briefly refer to other gill-bearing fungi. In all the species hitherto mentioned the stipe is attached at the centre of the pileus, and the rather sharp knife-blade gills radiate from its apex, or very nearly so. In the Chanterelle (Fig. 11), however, the gills are not sharp and straight, but blunt and more or less wavy, and extend for some distance down the stipe, so that they appear more like ridges or folds than knife-blades. The Chanterelle is often very abundant in midsummer in woody places, and is easily recognized by its peculiar gills and color, which is egg-yellow. We have other species of Chanterelle, but, with one exception, they are not dangerous, and the common edible Chanterelle is not likely to be confounded with the dangerous form if one recollects that the under surface, as well as the upper surface, is of an egg-yellow, and that the upper surface of the pileus is flat, or a little concave, but is not hollowed out in the form of a funnel.

The oyster fungus, Agaricus ostreatus, grows in large masses on the base of old trunks, often as late as November. In this species and its allies the stipe is not attached at the centre of the pileus, but at one side or on the margin, and the long gills are prolonged down over the stipe. The different pilei overlap one another, and the shape of each pileus in Ag. ostreatus is a little like that of an oyster-shell. We mention this fungus because it is edible; not very good, however, to our taste. Lastly, we may mention the so-called Fairy-ring fungus, common in door-yards and grass-plots. It is of a dull yellowish white color throughout, of small size, seldom more than two inches across, with a slender hollow stipe and comparatively few coarse gills. The substance is rather tough, and the fungus does not easily decay, but after drying, revives when the weather becomes moist again. It gets its name from its habit of growth. The fungus appears in tufts in the grass, the tufts being arranged in the circumference of a circle, and the circles may be recognized at a distance, from the fact that just within the circle formed by the fungus is a circle of grass more luxuriant than elsewhere. We cannot stop

Fig. 11.—Cantharellus cibarius, Chanterelle (two-thirds natural size)—edible.

to explain the origin of the grass rings, the so-called fairy-rings, but it should be said that this is not the only species which causes fairy-rings, although they are unusually well marked in this case.

Harvard College. *W. G. Farlow.*

New or Little-known Plants.

A Fastigiate Sugar-maple.

THE branches of the Sugar-maple in its juvenile state often assume an upright habit of growth, and during the first twenty or thirty years of its life this tree is more apt to produce a narrow oblong head than one of any other shape. Later the branches become horizontal when they find sufficient room in which to spread, and the head of a well-grown Sugar-maple in the prime of life is broad and round-topped. That this is not the universal habit of this tree, however, is shown in the illustration on this page, which represents an individual on which all the branches are regularly and constantly fastigiate. It is the only large Sugar-maple with this habit that we have seen, and as fastigiate trees are curious, interesting and often beautiful objects which permit the landscape-gardener to produce effects which cannot be made without them, it is desirable that this individual should be propagated by grafting. This is specially important, because up to the present time only two other American trees have produced forms with fastigiate branches; these are the fastigiate Robinia, or Locust, which appeared in 1839 in Leroy's nursery in Angers, and the fastigiate Tulip-tree, which originated much later in Alsace. The other trees of fastigiate habit which are available for our planters are varieties of European species, and as these are less successful, as a rule, in this country than our native trees, planters who may require a fastigiate tree to produce a particular effect will be glad to replace European by American species where it is possible to do so.

The tree, whose portrait we publish, is growing in the grounds of Mrs. Leavitt, in Flushing, in this state; it is now some eighty feet tall, with a trunk diameter of two feet at three feet above the surface of the ground, and is supposed to have been planted in its present position more than fifty years ago, and to have been taken originally from the seed-rows in the old Parsons' nurseries.

Fig. 12.—A Fastigiate Sugar-maple, at Flushing, New York.

New Orchids.

MASDEVALLIA REBECCA.—This is a hybrid between Masdevallia ignea erubescens × M. amabilis. The flowers are as large as those of the seed-parent; the perianth tube is cinnabar red; the veins crimson; the free portion of the upper sepal triangular, contracted into a slender tail one and a half inches long, nearly upright, and deep orange-red. The lateral sepals are connate to the middle, terminating in short tails, of deep red color, studded over with rich crimson-purple papillæ. This hybrid flowered for the first time in January, 1893, in the collection of Mr. Ames, Langwater, where it was raised, and so highly did Mr. Ames

think of it that he named it in honor of Mrs. Ames. It has again flowered, and the flower is even more brilliant in color than it was last year, and is, indeed, the richest in color of any Masdevallia I have yet seen. The plant was described last year by Dr. Kranzlin (*Gardeners' Chronicle*, ser. 3, xiii., 740).

Masdevallia Henrietta.—This is a hybrid between M. ignea and M. caudata, var. Shuttleworthi. The flowers are intermediate in form between the parents, although much larger than either. It flowered for the first time in January, 1893, and ten plants of the same cross have already flowered, no two of which are exactly alike. Some flowers are striped, more are beautifully spotted, some on a light yellow, and some on orange and some on rose-colored ground. It is of easy culture and flowers freely. One plant is carrying fourteen flowers, and it is not yet five years old. Dr. Kranzlin described this plant last year in the *Gardeners' Chronicle*, *l. c.*

Masdevallia, Mary Ames.—This is a hybrid between M. ignea × M. Gairiana. The perianth tube is orange-red; upper sepal triangular, contracted into a slender tail, one inch long; orange, with reddish tips; lateral sepals connate to the middle, gradually terminating with a short tail. The color is orange, margined with deep red. The dorsal-sepal is almost upright. This hybrid flowered first in December of last year. It is of compact habit, the flowers rising just above the foliage.

Selenipedium Helenæ.—This new hybrid, between Selenipedium Wallisi × S. leucorrhodum, bears a flower which shows the influence of both parents. The upper sepal is yellow, tinted rose; lower sepal yellow; petals drooping, yellow, tinted rose; lip yellow, slightly suffused with rose; infolded lobes creamy white; staminode creamy white, fringed with blackish purple hairs. The influence of S. leucorrhodum preponderates in the shape of flower and foliage. This hybrid flowered in twenty-five months from the seed.

North Easton, Mass. *William Robinson.*

Cultural Department.

The Conservation of Water for Orchards.

THE following paper, by Professor I. P. Roberts, was prepared for the fruit-growers of western New York, but the doctrine it contains will be found of general application:

Water carries all of the food of plants and animals into circulation and all excreted material out of circulation, so there cannot be abundant growth and vigorous healthy life without there is an abundance of water always present in the tissues of growing organisms. Most living plants contain from seventy-five to ninety-five per cent. of water, but, notwithstanding the great need of plants for a liberal supply of water, the soil may easily contain so much as to injure or even destroy them. Superfluous water in ordinary cases may be carried off by surface and underground drains, but the problem of supplying water cheaply to plants when there is a lack, is a difficult one.

In most localities in the eastern and middle states, surface irrigation is found to be impracticable (1) on account of lack of water, and (2) because on many soils surface irrigation injures the land. Clay lands, unless most thoroughly underdrained, become puddled, sour and reduced in productive power when thus irrigated. Only on certain classes of soils, usually found in arid countries, does surface irrigation become fully successful. Sub-irrigation is the ideal method, but it is so expensive that it can only come into use where large amounts of very valuable products can be secured on small areas.

With few exceptions, all cultivated plants have to depend on the water stored in the soil. How to make a great store-house for water in the soil without saturating it, and how to get the water near the surface for the use of the plant without letting it escape during dry weather, are, therefore, subjects of prime importance to every plant-grower.

An acre of soil one foot deep will weigh about 1,600 tons, and may contain, when in good condition for growing crops, thirty-two per cent. of water, say, 500 tons or 4,000 barrels per acre. If the soil is too compact or too loose, not more than half this amount, sometimes not more than one-quarter, will be contained in the interstices of the land. Soils vary greatly in their power of holding water without being saturated. A friable clay loam has the power of storing water to a much larger degree than heavy clay or loose sandy soils. Heavy rains in the fall and spring tend to puddle the land—that is, fill the interstices which are between the particles or molecules of earth, thereby diminishing to a great extent the storage capacity of the land. Often about the only object of deep culture is to overcome the effect produced by heavy beating rains and to enlarge the capacity of the soil for holding on to moisture. There is a large amount of water stored in the first twelve inches of the surface soil, and we know that a large additional amount is found in the subsoil. In some cases it is far more than is found in the surface soil, although usually that is not the case.

The question arises, how to make the best use of and how to conserve this stored-up water, which finally contains all the nutritious material which enters into the circulation of the plant. Thin seeding assists materially in the conservation of moisture. Plants usually suffer in the middle and latter part of the summer when they are trying to produce fruit. If too many plants are growing upon the surface the land will already have been robbed of its moisture before the fruiting season, and a failure to produce satisfactory seeds and fruits is inevitable.

Another method of conserving moisture is to shade the land, but if this is done with growing crops, as clover and the like, the amount of water which is evaporated from the leaves is greater than that which is conserved by the shading. So, where the object is to conserve the moisture for the use of the tree when it is fruiting, it is not wise to have growing crops in the orchard.

Mulching of the soil with straw or other coarse material cannot be practiced in any large way, and, therefore, little dependence can be placed on this method. In bearing orchards this should be done, if at all, about the last of June. The conservation of moisture by surface cultivation has been found eminently successful. The enlarging of the capillary tubes at the surface prevents the water from rising; the loose upper layer shades the land and keeps it cool, thereby preventing to a large extent surface evaporation.

Some experiments conducted during the winter in a warm room out of the direct rays of the sun, gave the following results:

(1) On plots cultivated about one and a half inches deep, less water by 2,000 pounds evaporated daily from an acre of soil than from plots of a similar character and under identical conditions, which had not surface culture. (2) On a heavy clay soil the evaporation from the cultivated plot in a day was 4,000 pounds less per acre than from the uncultivated plot. (3) On a clay loam evaporation was 4,400 pounds less in a day. (4) On a light garden-soil it was 2,500 less than on the cultivated plot per acre than on that which was not cultivated.

It will readily be seen what a vast influence the daily cultivation had on the moisture of the soil. Some experiments conducted several years ago with a mixture of equal parts by weight of salt and plaster applied to the land at the rate of 4,000 pounds to the acre conserved the moisture of the first four inches to the amount of fifteen tons of water per acre—that is to say, the soil which had been treated with this mixture contained, about two weeks after the mixture had been sown, fifteen tons of water per acre in the first four inches more than the adjoining plots which were not treated. This amount of water, it is true, is not large, but it was large enough during a drought, when the experiments were conducted, to furnish enough extra moisture to the growing Oats to be easily discernible by the growth of the plant. There is not the slightest doubt that a weekly surface cultivation of orchards, from June until the last of August, helps materially to save the water in the soil, while at the same time culture sets free plant-food and keeps the lower strata of the soil cool and moist. Wherever the conditions do not forbid surface cultivation it should be practiced extensively in orchards for the threefold purpose of conserving moisture, preparing plant-food and shading that portion of the soil which is occupied by the roots of the growing plants.

Grapes in January.

WITHOUT special precautions beyond storage in a cool cellar, I find that I can have the following grapes for eating in midwinter: Pocklington, Diana, Herbert, Duchess, Amber, Iowa, Jefferson, Lady Washington, Vergennes, Goethe, Isabella, Catawba, Niagara, Hayes, Diamond, Gærtner and Worden. Concords have kept well with me as late as the end of December. The grapes were carefully handled in picking,

placed in new sweet baskets, about half-filled, and set at once in bins in a cool, dry cellar. At the approach of cold weather I aim not so much to have the room cold as to have an unvarying temperature for the grapes, and a piece of thick brown paper is tied close over each basket. The quality of the Worden is unsurpassed, and this variety supplies a delicious winter grape up to mid-December. Duchess, if picked before cracking, keeps well, and I had Brighton in good condition in December, when it dries into a very good raisin.

There are enough good grapes which ripen in August, September and October. The need is for long-keepers. Of those we now have, Amber and Diana are excellent; but Amber is one of the class of very tart grapes, like Greins' Golden, and is relished by few. Goethe and Iowa should be ranked as November and December grapes, and there is nothing to excel them. Herbert is another satisfactory grape, of excellent quality and a fine keeper. Vergennes, although keeping well, lacks in quality, and is at no season a grape of much value. It is a curious fact that some of the thin-skinned grapes are among the best keepers. Goethe, Iowa and Worden are thin-skinned, while Diana, Herbert and Vergennes are much thicker.

Clinton, N. Y. *E. P. Powell.*

Annual Flowers from Seed.—I.

NOW that the days begin to lengthen and the seed-catalogues, in their lurid magnificence, present their annual temptations, every one who has an available strip of earth and good, healthy, natural instincts, with a little leisure, will feel a yearning for the vernal weather, which is the seed-time. This yearning, unfortunately, often does not materialize into action, for we are a busy people, and our attention is apt to be diverted from things which require study, thought and some care, by the things crowded on our attention in all directions. Among the people who seriously wish to have a garden, which they are possibly undertaking for the first time, there are many, of course, with an almost entire lack of knowledge of plants, and especially of their culture from seed. No questions are so often asked of the gardener as "what shall I plant," and "when" and "how," and "which are really the best things to grow?"

Seed-catalogues do not answer these questions exactly, or, rather, they give too many answers, from the very extent of their lists of seeds, all of which are required, more or less, by different patrons. A seed-catalogue, at the best, is lacking in perspective, and it may be well at this time to review the subject of the sowing of seeds of annual plants, or those which flower the first season from seed, in order to anticipate the annual inquiries for the most useful and satisfactory plants, not only for the borders, but also for cutting and house decoration. Good plants of this character are so much valued that florists and cultivators are constantly selecting and hybridizing the most approved strains in the endeavor to effect improvements, and these, or the novelties as they are called, appear with unfailing regularity. A surprising number of these are remarkably good, and there is from year to year a constant gain, but these gains are most appreciated by those of experience, who, if thorough-going gardeners, usually feel repaid for an outlay by the pleasure of trying for a prize. A beginner should rather confine his attention to the old approved forms until his taste develops in some definite direction. For instance, if one is fond of China Asters, almost anything new will prove satisfactory, but if he does not care for the family, nothing, even of the rarest, will please. People persist in buying new Godetias or some other flower the type of which they do not care for, and grumble at the seedsman for selling them what may be a very meritorious thing from some other person's point of view.

When to sow seed is a question which admits of no general answer, but as the beginner usually buys his entire stock in lump as the first genial day warms his garden-fever, it may be said that most annuals will flower satisfactorily if planted in this latitude in late April or early May in proper locations. Most of them are better for not being hurried forward, and they are always stronger when they can be germinated under moderate warmth, and with a plentiful supply of fresh air in all stages. Unless otherwise stated, the seeds of plants to which attention will be called are best sown out-of-doors in a temporary frame, which should be located in a warm place, or in one sheltered from cold winds. A temporary frame made by nailing four boards to enclose a square or rectangular space is as satisfactory as a more elaborate construction. For the top, provide a covering of thin stuff like cheese-cloth or waterproof fabric. A raised bed should be made inside this frame of good sweet, loose loam, free from clay or packing qualities. The lower layer should be passed through a medium meshed sieve and be well firmed. The seed-plots should be marked out with a flat stick and the earth well moistened and allowed to drain. A bed prepared in this way, with the cover stretched over it, will be ready in this latitude for its contents the last week in April, usually, and tender as well as hardy annuals may be planted with safety. As a matter of convenience, it is well to separate the fine-seeded kinds from the coarser ones, so that when sifting earth over them for a final covering, the fine ones may not receive an undue proportion. As a rule, seeds should be covered with a layer of soil about equal to their diameter in thickness, though it does not injure the coarser ones to bury them deeper. The earth should be firmed over the seeds so as to envelop them in a moist compact covering, and if the seed-bed has been judiciously watered most of the seeds should germinate without further moisture. As seeds do not require light for actual germination, moisture may be preserved by covering the seed-bed with paper for the first few days. As soon as the seeds are fairly well germinated, as they will mostly be in a week or ten days, air must be given as freely as possible, though the plants should at first be shaded from sunlight.

In the earlier stages of the plants care should be taken not to keep them close at any time or to overwater, which will cause them to damp off and to rot at the surface of the ground. In a cold, wet season slugs may appear, and these are very fond of young growths. If missing or eaten leaves show their presence, vegetable traps, like sliced potatoes, should be set for them, and the slugs destroyed in the early morning. Aside from these possible visitations, the seedlings, with ordinary and slight attention, will soon make their first true leaves, after which they are ready for transplanting. While they are making their growth in the open it is always prudent to cover the beds with a light covering of thin brush to discourage cats, hens and other marauders. A frame of this kind is a labor-saver, as the work is concentrated in one spot and the various sowings can be rapidly inspected and the necessary attention given. When seeds are sown in various plots in the garden the work is so many times magnified, and various disasters are sure to befall some of the plantings. Most plants can be readily transplanted in a young stage, Poppies and Mignonette being about the only ones which offer any difficulties. The former are always better for being sown in the fall, but are not difficult to transplant when young if the seed-bed is allowed to become quite dry and the long tap-roots are not injured in lifting. Mignonette resents root-disturbance, and should be lifted when the ground is moist, with a good ball of earth.

The transplanting of other annuals is a simple operation. Having thoroughly prepared the beds into which they are to be transferred by deep digging and fining the soil, it is well, if possible, to await a favorable time, such as the approach of cloudy weather, avoiding a period when the ground is wet and in a condition to pack as one presses it. Providing the ground is in fit condition, transplanting may be safely done in the brightest weather if temporary shading is supplied. It is well to have a few two-by-two or three-by-three frames made of laths, with cheese-cloth stretched over them. These are useful at all seasons in the garden for temporary shelter in transplanting operations. Furnished with a flat pan and a three-tined kitchen fork as a digger and dibber, one can rapidly raise the young plants from the seed-bed and transplant them. If the seed-bed has been made properly of loose earth the seedlings can be separated easily and without breaking the young roots. A hole is dug, the plant is given a gentle twirl to spread the roots as far as possible, and the dibber, inserted a short distance away, is used to bring the earth up solidly, so as to leave no hole or vacancy around the roots. The plat being planted, each plant should be settled by careful and not overmuch watering, and loose dry earth drawn toward the plant as a mulch. If some well-rotted manure is available, a covering of this over the bed is a desirable finish, and supplies the plants with a mulch, and later with food. The beds must be shaded until the plants show signs of moving or cloudy weather allows them to be fully exposed.

As to what to grow, the element of taste enters so largely in the selection that we must advise those species which, by general consent, are considered the leading and most satisfactory ones. Considering these in catalogue order, the China Asters occupy certainly, in every way, a leading place and are indispensable. Naturally flowering in August and September, not much is gained by hurrying them into bloom until the cool nights of late summer. The seeds are of fair size, easily handled, and germinate at sixty to seventy degrees rapidly and strongly. They must not be overheated in any stage, and must have air and light to keep them stocky. They should be planted in rich, well-drained soil, and, in order

to be well cultivated, in rows nine to twelve inches apart. A good mulch of manure will be helpful, and they should never suffer for lack of water. The ordinary varieties require staking. They have usually two insect pests, a white grub, which attacks the roots and quickly ruins the plants attacked, and a black beetle, which devours the flowers as rapidly as they expand. The latter may be exterminated by patient hand-picking, but there should be no delay. As to varieties, one cannot go amiss in cultivating "Truffant's Pæony-flowered," with incurved petals, and the "Improved Victorias," with reflexed petals. These are to be had in six different colors, and it is more satisfactory to buy the colors separately. Most of the other strains have some merits, and the dwarf ones are admirable for garden decoration in the front of borders. The Comet Asters are a beautiful strain, with petals twisting and less formal than others of the family. The pink variety of this is a fine flower, but the gem of the strain is the "Large white," introduced last year by Vilmorin, which is a grand flower. The French florists now offer Comet Asters in all the colors through which the species ranges. The branching Aster, or Candelabrum, is a fine-flowered plant with long branching stems, which are specially useful for cutting, though the most effective way to use Asters is to cut the plant at the base and treat it as a bouquet. It is curious that one seldom or never finds a single Aster among the seedlings, yet self-sown seedlings, which often come up in gardens, are seldom other than perfectly single. Some of these are beautiful flowers, and probably would be much appreciated if they were rare.

Elizabeth, N. J. *J. N. Gerard.*

Single White Pæonies.

IN the last volume of Garden and Forest, page 305, there was a beautiful illustration of a white-flowered variety of the Siberian Pæonia albiflora, and though I had never seen it, it was very evident that the great pure white petals, with their central cluster of yellow stamens, gave the flowers a singular delicacy and grace, and that, in spite of its large size, it had not a single element of coarseness. I have found since then that it is very difficult to secure these plants, although it was called an old-fashioned flower. In a late number of the London *Garden* I observe a colored plate with the description of another single-flowering Pæonia, P. Emodi, an Indian species. It looks as if it were closely related botanically to the Siberian plant, but it is described as quite distinct in habit and as especially valuable for its earliness, since it blooms in England some two or three weeks before the varieties of P. albiflora. The flowering shoots are described as from three to three and a half feet high, having one to five buds on each shoot, according to its strength, although it is rarely the case that more than two of them open together. The pure white flowers are from four to six inches in diameter, with a bunch of golden yellow stamens, and when the fruit is ripe the persistent calyx turns to a bright red, which later on dehisces, exposing bluish purple seeds and making a very pretty object. Since it is found at high altitudes in the western Himalayas, it ought to be hardy here, although it is said to succeed best in England against a south-east wall.

The article in Garden and Forest, before alluded to, calls attention to the fact that a single white-flowered variety of Pæonia officinalis was exhibited by the elder Thomas Hogg in New York as early as 1826, and a plant of this kind, under the name of P. officinalis alba, is described in *The Garden*. It would be interesting to know if any descendants of this Pæony still remain in cultivation in America. Among the other white-flowered Pæonies named is P. villosa, a little plant with stems not more than eighteen inches high, carrying a daintily cupped white flower on a short peduncle, surrounded by a collar of dark green leaves. Our plantsmen are beginning to give some attention to single-flowered Pæonies, and it seems certain that any one who secures a stock of these white-flowering varieties will find a ready demand for them. As cut flowers for decorative purposes, and for masses in the garden they have few superiors.

Brooklyn, N. Y. *S.*

Hardy Carnations.—What the English call border Carnations are comparatively rare in cultivation here, although our growers have made a striking success in getting improved types of the varieties used for winter-forcing and have acquired wonderful skill in the cultivation of these plants. These Carnations, which bloom so well in glass-houses, have been derived from the hardy type, and there is no reason why the hardy ones should not grow as well here as they do in Europe. Gardeners who come here from abroad find our climate hot and dry, and they are therefore inclined to consider it unsuitable for these Carnations, and this is undoubtedly to some extent true; but it is also true that many of them will succeed here with ordinary care. A few people have grown them with great satisfaction for years, and visitors to the World's Fair in early August remember the bed of these plants which glowed upon the wooded island. This note is suggested by a paragraph in a late bulletin from Cornell University, where an account is given by the Professor of Horticulture of some trials with the seed which he secured in the spring of 1892. The varieties tried were Early Marguerite, Self-colored, Early Dwarf, Mixed Vienna, Red Grenadine, Splendid Rose-leaved, Picotee and a few others. The seed was sown in boxes in the greenhouse on the 8th of March, but it is stated that they might have been sown later and with equal success out-of-doors. The plants were set out in the field as the season advanced, and a few of them bloomed that autumn. They passed safely through a severe winter on a bleak hill-top without any protection whatever; they began to bloom about the middle of June, and kept up an uninterrupted display of bright and interesting flowers until late in August. Although this was a mixed collection from seeds of many varieties, all the strains were interesting, and the single flowers were especially so. The so-called Mixed Vienna seemed to be rather more attractive than the others, the color of its single and semi-double flowers ranging from ivory-white to rose-red, being very pure and dainty. Some of the plants, taken up in the fall and removed to the house for winter-blooming, proved very attractive. These hardy Pinks will live on from year to year, although it would be better to raise new plants from seed than to trust the old ones for a second season of bloom.

Ithaca, N. Y. *R. A.*

Correspondence.

Mandarin and Tangerine Oranges.

To the Editor of Garden and Forest:

Sir,—In your notes on the fruit-markets of New York you often speak of Mandarin and Tangerine oranges as distinct fruits. Will you please tell me if they belong to different species, or are they varieties of the common Orange?

Buffalo, N. Y. *S.*

[Mandarin and Tangerine have come to be the accepted names in the market of two varieties of Citrus nobilis, a species which differs from the common Orange in the more diffuse manner of its growth, narrow leaves and wingless petioles, and especially in the fruit, which is, as a rule, smaller and flatter at the ends, with the rind loosely attached to the dryish carpels, which are not so numerous as in the common orange, and separate more easily. The King orange, the Satsuma or Oonshin and the Bouquet des Fleurs are all varieties of the same species, and Kid Glove orange and sometimes Tomato orange are common names applied to all. In some places the terms Mandarin and Tangerine are used to include the whole class, but Professor Clute, of the Florida Experiment Station, who has kindly sent us some notes on the varieties as they are known in Florida, says that they are no longer used in this generic sense in that state. Mikan appears to be the generic term for all these fruits in Japan, while Kan is the Chinese term.

The King orange, which does not mature until May, is highly prized for this lateness of ripening, as well as for its excellent flavor. The fruit is large and knotty, and could hardly be described as beautiful. The Satsuma ripens even earlier than the Mandarin or Tangerine, that is about the middle of October, and it usually commands a high price on account of its extreme earliness, although it is not as sweet as the other varieties of this species. The fruit is about the same size as that of the Tangerine. The color of its rind is somewhat intermediate, between that of the Tangerine and Mandarin, but its shape is more nearly that of a common orange, being round rather than flattened. As between the Mandarin and Tangerine, the former ripens earlier, or about the middle of December; the latter ripens a month later. The Mandarin is larger, is of a lighter orange color, it has a coarser pulp, its stem is surrounded by a larger knobbed eminence, its rind is more flabby, and the proportion of rind to pulp is larger. It is considered

sweeter, more sugar-like that is, than the Tangerine, but lacks its rich flavor. Because of this flavor, and because of greater juiciness, the market price of the Tangerine is generally ten per cent. above that of the Mandarin. The Mandarin and Tangerine trees may be described as dwarf, while the Satsuma tree, although larger than either of the others, would be called semi-dwarf, since it rarely reaches the size of the ordinary Orange-tree. The lanceolate leaves of the Mandarin tree give it very much the appearance of an ordinary Willow. The foliage of the Tangerine more closely resembles that of the common Orange, though the leaves are smaller. The Satsuma is described as thornless, the Mandarin nearly so, while the Tangerine has more thorns than either of the others.—ED.]

The Relation of Forestry to the State.

To the Editor of GARDEN AND FOREST:

Sir,—A highly interesting address was given by Dr. J. T. Rothrock, of the Pennsylvania Forestry Commission, on this subject, before the State Board of Agriculture, in Harrisburg, on January 24th.

Interest in forestry legislation is plainly growing here, and Dr. Rothrock, who has engagements to speak in nearly all the counties of the state, is unable to comply with the many requests now coming in. The lecture, fully illustrated by lantern-slides of views taken by the lecturer, was a forcible presentment of facts relating to the present condition of land in Pennsylvania, and it was followed by a prolonged discussion of minor points suggested, although over the main facts no controversy was possible.

After reading the law and amendments as they now appear on the statute-books in regard to timber bounties and tax rebates, of which, singularly enough, most of the audience knew little, Dr. Rothrock went on to speak of denuded, swamp, inundated and burned-over lands. The pictures needed almost no explanation, and were only too clear in giving renewed evidence of the sad facts familiar to every one in the audience, where utter desolation had followed the criminal extravagance and ignorant misuse of woodlands. The first illustration was a view of a hill-side farm, a barren, almost repulsive, spot, obviously unfit for agriculture. Yet of these so-called farm-lands there are in Pennsylvania not less than 3,000 square miles in supposed cultivation. Swamps, barren hill-sides, and the bottom-lands of the Juniata, once producing good crops, but now in many places ruined by floods, were shown. The most hopeless feature, however, was the devastation caused by fire. Optimists might consider some of the statements exaggerated for effect, but the silent slides carried conviction to all.

The Forestry Commission of Pennsylvania differs from that of several other states in covering not a section, but the entire state; so that two years, the time appointed in which to make examinations, surveys and reports, is none too long.

Harrisburg, Pa. *M. L. D.*

Recent Publications.

The fourth volume of the *Contributions from the United States National Herbarium* is devoted to an account of the botany of the Death Valley Expedition, sent out in 1889 by the United States Department of Agriculture to make a geological survey of Death Valley, California, written by Frederick Vernon Coville, botanist of the expedition, and the present head of the Division of Botany of the Department of Agriculture. This is a most important contribution to our knowledge of the flora of an interesting region, and contains a vast amount of information on the distribution of the plants of our south-western states and territories. The first part of the report is devoted to the author's itinerary, which consists of a record of Mr. Coville's location on each day that he was in the field, with references to such prominent features on the route as were of particular botanical interest. This is followed by an essay on the conditions influencing plant-distribution, with an analysis of the flora of south-eastern California into its smaller component floras, and a consideration of the relation of these to each other and to the floras of adjacent parts of the country, with remarks on the characteristics and adaptations of the desert flora and a discussion of its modifications under existing environmental conditions.

The next part of the work consists of a catalogue of the species collected, with bibliographical references and geographical notes. This catalogue is followed by a catalogue of specimens collected by the expedition, arranged by numbers, and by a bibliography of works referred to in the report, which is, moreover, illustrated by seventeen plates lithographed on stone and by an excellent route map.

Forty-two undescribed species and varieties were brought to light by the expedition. This is certainly not a very large number in view of the extensive area traversed and of the imperfect character of our previous knowledge of its flora. Two new genera are proposed—Orochænactis, based on a plant previously referred to Chænactis, and Phyllogonum, an annual plant allied to Eriogonum. Twelve hundred and sixty-one species and varieties are enumerated, of which rather less than half were found in the desert region of California, the remainder having been collected on the Sierra Nevada and its southern continuations and in the Tulare plains.

Among the numerous changes of nomenclature we notice that Fremontodendron replaces Fremontia for the beautiful yellow-flowered tree so common on the foot-hills of southern California, Fremontia having been used by Dr. Torrey for a plant now known as Sarcobatus vermiculatus before he used it for this tree, so that under the rules now in force among American botanists Fremontia must be forever delegated to our fast-growing collection of synonyms. Larrea Mexicana, the common Creosote-plant of the desert, now becomes Larrea tridentata, which Dr. Coville tells us is "the most important zonal plant of the lower Sonora zone, growing with great uniformity over nearly the whole area of the desert region."

The first number of Bulletin No. 9 of the Geological and Natural History Survey of Minnesota, to be devoted to botanical studies, has reached us. This is a new botanical publication, provided for by the Legislature of Minnesota and intended to contain papers whose immediate publication, in advance of the regular reports of the Board of Regents of the Geological and Natural History Survey of the state, is considered important. The first issue contains papers on the occurrence of Sphagnum atolls in central Minnesota, by the editor, Professor MacMillan; on some extensions of plant ranges, by E. P. Sheldon, who also contributes a paper on the nomenclature of some North American species of Astragalus; a list of fresh-water Algæ, collected in Minnesota during 1893 by Josephine E. Tilden; and on the poisonous influence of Cypripedium spectabile, and of Cypripedium pubescens, by D. T. MacDougal. On the last topic the author says:

An examination of these plants reveals the presence of two forms of hairs in great abundance; one is a curved pointed septate hair, the apical cell of which has hard brittle walls, and is easily detachable from the basal portion of the organ; the other form is a septate glandular-tipped hair. The glandular cell is filled with a light brown substance of which the chemical nature remains unknown. The contents of both hairs show a decided acid reaction, but were not observed to exert any harmful influence on infusoria placed under the cover-glass with them. The poisonous effects may be due to the piercing of the skin by the pointed hair and the consequent action of the acid contents, or to the surface irritation by the contents of the glandular hairs, or it is remotely possible that they are due in some way to the presence of a fungus.

Mr. MacDougal considers that the poisonous effect of Cypripedium spectabile is conclusive, and argues that as Cypripedium pubescens is furnished with a similar apparatus, there is every reason to believe that it is equally injurious. He suspects, however, that both plants "may be handled by the majority without danger—yet it is easily apparent that these species, as well as others of the genus, are protected in a manner that renders them unpleasant to grazing animals, as it has been repeatedly

noticed that large numbers of these plants growing in woodland pastures have been found intact, while the surrounding herbage would be closely cropped."

Cypripedium pubescens, it appears, has been formally adopted as the state flower of Minnesota.

Notes.

The collection of North American woods exhibited at the Columbian Exhibition by Mr. Morris K. Jesup, President of the American Museum of Natural History, in this city, which attracted so much attention last summer in the Forestry Building, has been presented by Mr. Jesup to the Arnold Arboretum.

A new pink Carnation was exhibited at the February meeting of the Philadelphia Florists' Club by Mr. A. M. Herr, of Lancaster, and named Annie Pixley. The flowers shown were of good size and borne on stiff stems, the color being somewhat like that of Edna Craig, but without the fimbriated petals of that variety. Annie Pixley is said to make strong growth and to flower abundantly, but, like many other varieties, it may prove quite another plant in another locality.

Mr. John F. Barker, Superintendent of the Forest Hill Cemetery, near Boston, has decided that a complete commercial fertilizer—that is, one in which the proper proportions of nitrogen, potash and phosphoric acid are all combined—is preferable to stable-manure for flowers. Stable-manure always contains many seeds of weeds and grass, and in this way necessitates much work to keep the beds clean. Besides this, soluble fertilizers supply the plant with food at once, and thus hasten their growth. The expense of applying the fertilizer is much less than it costs to handle manure. When asked if manure was not needed to give a certain amount of humus or vegetable matter to the soil, Mr. Barker gave it as his opinion that where vegetable matter was needed to lighten up the soil, a thorough trenching of the ground, which he invariably practiced every spring, whatever kind of fertilizer was used, would keep the soil in a sufficiently porous condition.

The last bulletin from the Cornell Experiment Station, in speaking of the recent varieties of Tomatoes in which the year 1893 was very prolific, pronounces Buckeye State (Livingston), a very large, round, heavy, purple, smooth Tomato, as the best novelty. Among other good ones were Aristocrat Dwarf (Livingston), with small but very uniform fruit, red, round, solid, and apparently a valuable variety for amateurs. Extra Early Advance (Burpee) was the earliest Tomato of the year. It bore small red fruits of uniform size and shape, and not far removed from the Cherry type, and was thought valuable on account of its earliness. Lemon Blush (Thorburn) has fruit of medium size, bright lemon color, with a faint blush, is early and good. Terra Cotta (Thorburn) bears medium large, tough, red, regular fruit, and is interesting on account of its novel color, and is apparently valuable. May's Favorite (Hawley & Co.) has medium red, uniform, regular fruit, and is promising. Salzer's First Prize (Salzer) is a variety with flattish, red fruit of medium size.

Professor Bailey reports some experiments with a new food-plant. The tuber from which the plants have been raised was picked up on the coast in Florida and sent to the station at Ithaca by Dr. Irwin F. Smith. Plants from this tuber have been grown for two years, and they proved to be Stachys Floridana, a plant which had probably not before been cultivated. In general appearance this resembles the Chorogi or Stachys Sieboldii, which was introduced a few years ago, and is still sold as an esculent. This plant differs from the Chorogi, however, in its more slender habit, its smoothness and its long-stalked cordate leaves. The tubers are somewhat larger, generally reaching a length of from four to six inches. It is rather more crisp and brittle than the Chorogi, while the flavor is equal and perhaps superior. It has not yet been grown in the open ground, but it will probably endure northern winters with the protection of a mulch, since tubers which have been frozen grow readily, so that there is every reason to believe that this species will add another attractive vegetable to our kitchen-gardens.

Mr. A. B. Dennis, of Cedar Rapids, Iowa, at the late meeting of the Horticultural Society of that state gave an interesting account of his experience with Burbank, Ogon and several other Asiatic Plums which had survived a temperature last winter of twenty-six degrees below zero, and remained healthy to the very tip of their branches, and full of fruit-buds for another year, after having borne a heavy crop this year. Mr. Dennis observed that these Plums are much more nearly allied to our hardy native Plums of the Chickasaw, Wild Goose and Miner groups than they are to the European varieties. Like our native species, they shed their leaves and ripen their wood early, while the fibrous quality of the fruit, the color and roughness of the bark, the multiple leaf-buds and other points of similarity are what would naturally be expected from the well-known fact of the close relation of the flora of eastern Asia to that of eastern America. We have only begun to improve our native varieties by selection, and the Chinese have been improving these allied species for generations. No doubt, the crossing of these oriental varieties with our native Plums offers a promising field for the hybridizer.

Patrick Barry, a large yellow russet pear of California origin, with white flesh and rich vinous flavor, is found in considerable quantity in market now. In boxes of selected fruit the pears are of immense size, and weigh a pound and a quarter each. Other varieties of pears which can be had now are Winter Nelis, from California, and Buerre Bosc, from Boston. Among apples, Albemarle Pippins are unusually cheap, owing, it is said, to a light demand for them in England. They sell at five dollars a barrel for choice fruit. Grapes are still being shipped from the interior of the state, and are arriving here at the rate of one car-load a week. They are mostly Catawbas, and five-pound baskets retail at twenty and twenty-five cents. Most of the Florida strawberries reaching this city now are green or otherwise inferior in quality, and sell at forty cents or less a quart, but the small supply of first-rate berries commands seventy-five cents. Occasionally there is seen a box of King oranges—or as they are called here, King of Siam—from the Halifax River, Florida, although this is rather early in the season for them. This orange belongs to the Mandarin or Citrus nobilis type, and in size and flavor excels all others of its class. A box containing from seventy-two to ninety-two oranges brings eight dollars at wholesale, and this fruit has been sold at retail for as much as $2.50 a dozen.

In the south-eastern part of France, along the shores of the Mediterranean and the vicinity of Cannes, Antibes, Nice, Grasse and Mentone, about seventeen hundred acres of land are devoted to growing flowers for commercial purposes. Roses and Carnations are the principal flowers grown, but Violets, Forget-me-nots, Lilacs, Camellias, Narcissus, Anemones and many others are raised in immense quantities. The flowers are all sent to the countries of northern Europe. Assuming Sweden, which stands lowest in the amount received, to be represented by 1, the amounts sent to other countries will be represented in the following proportions: Austria, 4; Switzerland, 16; Belgium, 10; England, 24; Germany, 32; France, 64. The cultivation of flowers for commerce began no longer than thirty years ago, and it is only within the last three or four years that it has attained these important dimensions. The trade has ben so prosperous that most of the market-gardens of that region have been replaced by flower-fields, Olive-trees have been uprooted, and there is hardly a peasant who does not watch the fluctuations of the floral market during the winter season and bring his small daily contributions to the dealers, who take them to the large wholesale exporters.

The Department of Agriculture has just issued a bulletin which contains abstracts of the most important of the state laws which have been passed within a few years on the subject of roads. The bulletin has been compiled by Mr. Roy Stone, who was appointed last autumn as special agent in charge of the road inquiry. Most of the old laws were so ineffective that the practical work of modern road-improvement has all been done under the new statutes. Fourteen states have passed new road laws which contain radical changes of methods, and there is much agitation for similar reform in many other states. In a letter of instructions which defined the scope of the present investigation, Mr. Stone was directed (1) to make inquiries in regard to systems of road-management throughout the country; (2) to make investigations in regard to the best methods of road-making; (3) to prepare didactic publications on the subject suitable for distribution; (4) to assist the agricultural colleges and experiment stations in disseminating information on the subject. This bulletin is confined to the first subject, and it will be followed by another, or, perhaps, a series, to give the best methods of constructing (1) common highways without gravel or stone; (2) graveled highways; (3) macadam and other stone roads. Besides this, data are to be collected relating to the transportation of accessible material for the proper surfacing of road-beds. Of course, the function of the Department of Agriculture in this matter is simply to furnish information.